

3.1 Function Expansion and Transforms

$$\begin{aligned} f &= \left\{ \xrightarrow{\text{sample}} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \right\} \\ g &= \left\{ \xrightarrow{\text{sample}} \begin{bmatrix} 1 \\ 0 \end{bmatrix} \right\} \end{aligned} \quad \text{Inner Product : } \langle f, g \rangle = \int_a^b f(t)g(t) dt$$

$$f(t) = c_1 g_1(t) + c_2 g_2(t)$$

$$c_1 = \frac{\langle f, g_1 \rangle}{\langle g_1, g_1 \rangle} \quad c_2 = \frac{\langle f, g_2 \rangle}{\langle g_2, g_2 \rangle}$$